(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 136 000**
B1

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **07.01.88**

(51) Int. Cl.[4]: **D 21 F 9/00**, D 21 F 9/02, D 21 F 3/00, D 21 F 3/02

(21) Application number: **84304886.9**

(22) Date of filing: **18.07.84**

(54) **Paper-forming machine.**

(30) Priority: **23.07.83 GB 8319906**
06.06.84 GB 8414444

(43) Date of publication of application:
03.04.85 Bulletin 85/14

(45) Publication of the grant of the patent:
07.01.88 Bulletin 88/01

(84) Designated Contracting States:
DE FR GB IT SE

(56) References cited:
CH-A- 447 799
DE-A-3 138 133

(73) Proprietor: **BELOIT WALMSLEY LIMITED**
Wood Street
Bury Lancashire BL8 2QT (GB)

(72) Inventor: **Arav, Ronnie Abraham**
13, Thorneyholme Close Lostock
Bolton Lancashire, BL6 4BZ (GB)

(74) Representative: **Ranson, Arthur Terence et al**
W.P. Thompson & Co. Coopers Building Church Street
Liverpool L1 3AB (GB)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European patent convention).

Courier Press, Leamington Spa, England.

EP 0 136 000 B1

Description

The present invention relates to twin wire paper forming machines and in particular to dewatering apparatus therefor.

In a twin wire paper forming machine a bottom wire passes over a lead-in forming box cover and moves along a path towards and over a sheet transfer box. In the region of the lead-in forming box an endless top wire after passing round a lead-in roll is brought into contact with the bottom wire and is subsequently separated from the bottom wire in the region of the transfer box and is passed round a drive roll whence it returns to the lead-in roll. Stock on the bottom wire is contained between the top and bottom wires and water is expelled from the stock during passage of the wires between the lead-in forming box and the sheet transfer box.

In some twin wire paper forming machines a contact element has been provided above the path of the wires between the lead-in forming box and the sheet transfer box to promote dewatering. Water expelled has fallen under gravity and dewatering has been further promoted by providing the contact element or cover with a discontinuous surface with or without suction to promote dewatering in an upward direction. However, such discontinuous surface has in practice had the disadvantage that slots or perforations forming the discontinuous surface could become plugged or blocked under certain conditions especially when used with groundwood stock with a high fines content thereby decreasing the dewatering action and creating operating problems and rendering the production of high quality, and even uniform quality, paper difficult to attain.

In the dewatering section of one two wire paper forming machine described in DE—A—31 38 133 the top wire comes into contact with the bottom wire whilst passing below a contact element with a discontinuous convex surface and expelled water falls under gravity whilst some can be removed upwardly by suction. The two wires leave the contact element in an upward direction and pass alternately above and below deflecting members arranged to deflect the wires into a wave-like path superimposed on a concave path extending across the opening of a housing disposed above the top wire, and thereafter the wires pass over a guide roll and then in a downward direction to the original plane of the bottom wire, and the top wire is separated from the bottom wire while passing round a further roll. Suction applied to the housing above the top wire withdraws some of the water expelled upwardly and the stock between the wires is further dewatered downwardly before the separation of the two wires.

According to the present invention a twin wire paper forming machine in which a bottom wire passes over a lead-in forming box and over a sheet transfer box downstream therefrom, and an endless top wire which turns over a lead-in roll and meets the bottom wire in the region of the lead-in forming box cover and is separated from the bottom wire to pass over a drive roll and return to the lead-in roll, the bottom wire passes over a foil unit which is disposed downstream of the lead-in forming box cover and has alternately solid and open areas, and the top wire passes below a trailing cover which is disposed downstream of the foil unit, is characterised in that the trailing cover has a continuous top wire engaging surface of which the leading edge serves to doctor water on the top wire into an autoslice.

Preferably the leading edge of the sheet transfer box is immediately upstream of the point where the top wire is separated from the stock retained on the bottom wire.

The sheet transfer box preferably has a slotted or perforated cover and a vacuum is created therein so that suction is applied to the stock before and after the point of separation of the top and bottom wires which is somewhere midway of the slotted or perforated suction area.

Preferably the lead-in forming box cover has a curved surface and the tension of the wires presses the two wires together to start a first dewatering action. The lead-in forming box can have as wire engaging surface either a blank or continuous cover or a slotted cover. The slotted cover can be used with or without a vacuum created in a box below it. In the former case, when the cover can be, for example, a ceramic, only upward dewatering results, whilst in the latter case both upward and downward dewatering takes place.

The alternating solid and open areas of the foil unit give rise to pulses which are beneficial to paper formation. These alternating solid and open areas can be created by a series of transverse individual foil members, bar or blades, the arrangement imparting a pulsating pressure to the wires to expel water alternately upwardly and downwardly. A short contact time between the bottom wire and each foil member, bar or blade gives a pressure pulse to the stock which is beneficial to good paper formation.

The downward flow doctored from the bottom wire by the leading edges of the foil members, bars or blades of the foil unit may be encouraged by introducing a vacuum into the foil unit below its cover. The water pushed upwardly through the top wire is doctored off it by the leading edge of the trailing cover into the autoslice and upwardly into a chamber or saveall, preferably with vacuum assistance.

The trailing cover is preferably blank, that is to say, it presents a continuous top wire engaging surface, and therefore stock that is pressed between the two wires is now dewatered in a downward direction. The trailing cover is preferably ceramic, but can equally well be of any material conventionally used for static wire contacting elements used in a paper forming machine. The radius of curvature of the trailing cover is preferably smaller than that of the foil unit in order to increase the pressure on the stock

between the wires. The sheet transfer box preferably has a convex surface and has a vacuum applied thereto to assure transfer of the sheet of paper to the bottom wire.

Whilst all the water expelled upwardly can be doctored by the leading edge of the trailing cover and withdrawn by the autoslice, a further or upstream trailing cover and a further upstream autoslice can be provided above the top wire upstream of the other trailing cover and autoslice and intermediate the lead-in forming box and the foil unit. The upstream trailing cover is preferably solid or blank, that is to say, it presents a continuous top wire engaging surface, and is preferably convex. The doctored water removed by the upstream trailing cover proceeds into a chamber or saveall of the upstream autoslice, preferably with light vacuum assistance.

The lead-in roll may be provided with upward and downward movement. The lead-in forming box and foil unit may be provided with an adjusting mechanism which enables them to be moved up and down and to rotate with respect to the wire line.

Preferably means are provided for increasing or reducing the width, angle and/or shape of the opening of the or each autoslice. The or each autoslice is preferably inclined with respect to the wire line and preferably at an acute angle with respect thereto.

The present invention will be further described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a general sectional elevational view of a twin wire paper forming machine according to one embodiment of the invention,

Fig. 2 is a detail of the machine of Fig. 1 to a larger scale,

Fig. 3 is a detail sectional elevation generally corresponding to Fig. 2 of part of a twin wire paper forming machine according to a second embodiment of the invention, and

Fig. 4 is a detail view of part of the trailing cover of both the embodiments of Figs. 1 and 2, and of Fig. 3, to a larger scale.

Referring first to Figs. 1 and 2, a twin wire paper forming machine comprises an endless top wire 14 entrained around rolls, including a lead-in roll 12 and a drive roll 13. The top wire 14 meets a bottom wire 15 over a convex lead-in forming box cover 1 of a lead-in forming box 2. The wires move in a direction indicated by the arrows A. The curved surface of the lead-in forming box cover 1 and the tension of the wires press the two wires together and start a first dewatering action of stock interposed between the two wires. Where a blank cover is employed for the lead-in forming box, such cover presents a continuous wire engaging surface and only upward dewatering will occur in that region. Where a slotted cover is employed both upward and downward dewatering will take place there.

An upstream trailing cover 8 is positioned inside the top wire downstream of the lead-in forming box and is blank and presents a continuous top wire engaging surface. An upstream autoslice 7 is disposed upstream of the trailing cover 8 and a leading edge of the trailing cover 8 serves to doctor water off the top wire 14 and into the autoslice 7. The doctored white water proceeds into the autoslice chamber or saveall 71 assisted by light vacuum in the chamber. The upstream trailing cover 8 is preferably convex.

A convex cover 4 of a foil unit 5 disposed downstream of the upstream trailing cover 8 adjacent the bottom wire 15 comprises a series of spaced apart blades 41 which extend across the width of the wires. The alternating solid and open spaces formed by the blades 41 generate pulses in the stock as it moves over the cover. This has a beneficial action to paper formation. The alternating pulses cause the stock between the wires to be dewatered both upwards and downwards. The downward flow is doctored from the bottom wire by the leading edges of the blades 41, and this downward flow can be encouraged by introducing vacuum into a box of the foil unit 5.

A trailing cover 10 is disposed downstream of the foil unit 5 and adjacent the top wire 14. An autoslice 9 is disposed upstream of the trailing cover 10, and a leading edge 101 (see Fig. 4) of the trailing cover 10 doctors water pushed up through the top wire by the foil unit blades 41 into the autoslice 9. This upward flow goes into a chamber or saveall 91 and is assisted by a vacuum created in the chamber 91.

After having passed over the convex foil unit blades 41 the two wires are pressed against the trailing cover 10 which is blank, that is to say, it presents a continuous top wire engaging surface, so that stock is pressed between the two wires and is now dewatered in a downward direction. The radius of curvature of the trailing cover 10, which can be a ceramic or any material conventionally used for static wire engaging elements used in a paper forming machine, is smaller than that of the foil unit cover 4 whereby to increase the pressure on the stock between the wires. After their contact with the convex trailing cover 10 the bottom wire comes into contact with the perforated surface of a sheet transfer box 11 within which a vacuum is created. Due to the resultant suction applied through the bottom wire to the paper sheet, transfer of the paper sheet to the bottom wire is ensured. The top wire separates from the sheet in the region of, and preferably approximately centrally over, the transfer box 11.

The lead-in roll 12 is provided with upward and downward movement which permits the top wire 14 to be brought into greater or lesser contact with the lead-in forming box cover 1. Increasing the area of contact increases the drainage whilst decreasing the area decreases the drainage. The lead-in forming box cover 1 and the foil unit 5 are provided with adjustable mounting as at 3 and 6 respectively, enabling the cover and blades to be moved up and down and rotated with respect to the wire line.

The autoslices 7, 9 are provided with adjusting mechanisms as at 72 and 92 respectively for

varying the width, angle and/or shape of the autoslice inlet openings.

Referring now to Fig. 3, in a twin wire paper forming machine according to a second embodiment of the invention, the lead-in forming box and the foil unit 5 are combined in a unitary structure 30. The upstream trailing cover 8 and the upstream autoslice 7 of the embodiment of Figs. 1 and 2 are omitted, and the bottom wire 15 passes over the lead-in forming box cover 1, which in this embodiment is blank or continuous and convex, and there meets the top wire 14 after passing round the lead-in roll 12. Downstream of the lead-in forming box cover is the foil unit 5 of which the cover 4 comprises a plurality of spaced blades 42, preferably about six as shown, extending transversely across the width of the wires. The blades 42 in combination establish a generally convex path for the wires and present alternately solid and open areas. The blades are conveniently inclined at an acute angle to the direction of movement of the wires so that their leading edges can doctor water off the under surface of the bottom wire. Downstream of the foil unit 5 is the trailing cover 10 which is solid, that is to say, it presents a continuous wire engaging surface and establishes a further generally convex path for the wires. Upstream of the trailing cover 10 is the autoslice 9 leading to the autoslice chamber or saveall 91, as previously described. Downstream of the trailing cover 10 the wires pass along a path similar to that shown in Fig. 1 to the sheet transfer box 11 which is not shown in Fig. 3.

During passage of the wires over the lead-in forming box cover 1 a first dewatering of stock between the wires occurs and water is expelled in an upward direction, followed by expulsion in both upward and downward directions. The radius of curvature of the path over the foil unit blades 42 is preferably shorter than that of the lead-in forming box cover, and similarly, that of the trailing cover 10 is shorter than that of the cover 4 of the foil unit 5: the combined action of all these wire contact elements is to press the wires towards one another and thereby press the stock therebetween to expel water therefrom.

Whilst passing over the cover 4 of the foil unit 5, the successive action of the blades 42 and the open spaces therebetween is to subject the wires to a pulsating pressure which expels water successively upwardly and downwardly. Water expelled downwardly through the bottom wire is doctored by the leading transverse edge of each of the blades 42 and descends under gravity.

Whilst water expelled upwardly through the top wire during passage of the wires over the foil unit 5 collects above the top wire, it is doctored by the leading edge 101 (see Fig. 4) of the trailing cover 10 and flows through the autoslice 9 into the autoslice chamber or saveall 91 with vacuum assistance.

The unitary structure 30 comprising the lead-in forming box and the foil unit 5 is pivotally mounted at 31, and adjusting means 32 are provided whereby the position and angle of inclination can be set as desired. The autoslice 9 is provided with an interchangeable mouthpiece 93 whereby the width, and if necessary, the shape of the opening can be changed as may be desired in order to obtain optimum operating conditions in removal of all the doctored water without inclusion of excessive air therewith. Such mouthpiece 93 may conveniently be of a high density plastics polymer such as polyethylene.

Similarly, the trailing cover 10 may be interchangeable, and may be of ceramic or of any material conventionally used for static wire contacting elements used in a paper machine former. Likewise, each of the blades 42 of the cover 4 of the foil unit 5 may be of ceramic or stainless steel, alone or covered or tipped with tungsten carbide.

The leading edge 101 of the trailing cover 10 beneficially doctors off any fibres from and has a cleaning action on the upper surface of the top wire 14. Moreover, the top wire 14 has a reciprocal cleaning action on the trailing cover 10.

A twin wire paper forming machine embodying the present invention can have the advantage that upward dewatering is done only by means of one or more autoslices which are excellent at removing water and highly resistant to plugging. The inclination of the autoslice channel(s) enables the speed of the dewatered stock imparted by the wires to be used to move the water into the associated chamber or saveall. The high water speeds in the channel(s) promote cleanliness, and the speed of the stock carries the water upwards into the associated chamber or saveall, thus requiring at best only a small amount of vacuum assistance. The upward and downward pressure pulses imparted on the two wires can improve the formation of the paper produced. The adjustment provided permits use of the forming machine for a wide range of paper making applications, and renders it suitable for high and low speed and for producing both heavy and light weight paper. During all the twin wire paper formation process, the wires are in contact with stationary elements only such as blades and covers. No rolls are in contact with the wires during the process of dewatering, and this is especially valuable at high speeds where vibration is avoided, and also at all speeds as problems caused by unclean rolls can be avoided. Having static elements only in contact with wires during the process of dewatering is especially beneficial when producing paper which must be free from pinholes. The dewatering capacity of a twin wire paper forming machine can be high as a result of the use of the lead-in forming box cover and the foil unit blades. The continuous increase of curvature of the path of the wires contributes to an increase in the dewatering capacity of the twin wire paper forming machine. Sheet transfer can be excellent due to vacuum transfer on the transfer box and due to the initial action of downward dewatering created by the trailing cover 10.

Claims

1. A twin wire paper forming machine in which a bottom wire (15) passes over a lead-in forming box and over a sheet transfer box (11) downstream therefrom, and an endless top wire (14) which turns over a lead-in roll (12) and meets the bottom wire (15) in the region of the lead-in forming box cover (1) and is separated from the bottom wire (15) in the region of the sheet transfer box (11) to pass over a drive roll (13) and return to the lead-in roll (12), the bottom wire (15) passes over a foil unit (5) which is disposed downstream of the lead-in forming box cover (1) and has alternately solid and open areas, and the top wire (14) passes below a trailing cover (10) which is disposed downstream of the foil unit (5), characterised in that the trailing cover (10) has a continuous top wire engaging surface of which the leading edge (101) serves to doctor water on the top wire into an autoslice (9).

2. A twin wire paper forming machine as claimed in claim 1, characterised in that the cover (4) of the foil unit (5) comprises a series of foil blades (41; 42) extending across the path of the wires (14, 15) and spaced from one another in the direction of movement of the wires.

3. A twin wire paper forming machine as claimed in claim 2, characterised in that each of the blades (41; 42) is inclined at an angle to the direction of movement of the wires such that its leading edge can doctor water off the under surface of the bottom wire (15).

4. A twin wire paper forming machine as claimed in claim 1, 2 or 3, characterised in that the foil unit (5) comprises a foil box below spaced apart blades (41; 42), means being provided for creating a vacuum in the foil box below the spaced apart blades (41; 42).

5. A twin wire paper forming machine as claimed in any of claims 1 to 4, characterised in that means are provided for creating a vacuum in a chamber or saveall (91) above the top wire (14) and with which the autoslice (9) is in communication.

6. A twin wire paper forming machine as claimed in any of claims 1 to 5, characterised in that the trailing cover (10) is blank and presents a continuous wire engaging surface to the top wire (14).

7. A twin wire paper forming machine as claimed in any of claims 1 to 6, characterised in that the cover (4) of the foil unit (5) establishes a downwardly forwardly convex path for the wires (14, 15), and the trailing cover (10) establishes an upwardly forwardly convex path for the wires (14, 15).

8. A twin wire paper forming machine as claimed in claim 7, characterised in that the radius of curvature of the convex path established by the trailing cover (10) is smaller than that established by the cover (4) of the foil unit (5).

9. A twin wire paper forming machine as claimed in any of claims 1 to 6, characterised in that a further upstream trailing cover (8) and an associated upstream autoslice (7) are disposed above the top wire (14) downstream of the lead-in forming box (2) and upstream of the foil unit (5).

10. A twin wire paper forming machine as claimed in claim 9, characterised by the provision of means for creating a vacuum in an autoslice chamber or saveall (71) above the top wire (14) and with which the upstream autoslice (7) is in communication.

11. A twin wire paper forming machine as claimed in claim 10 or 11, characterised in that the upstream trailing cover (8) is blank and presents a continuous wire engaging surface to the top wire (14).

12. A twin wire paper forming machine as claimed in any preceding claim, characterised in that the cover (1) of the lead-in forming box has a curved wire engaging surface.

13. A twin wire paper forming machine as claimed in claim 12, characterised in that the cover (1) of the lead-in forming box is blank and presents a continuous wire engaging surface to the bottom wire (15).

14. A twin wire paper forming machine as claimed in claim 13, characterised in that the cover (1) of the lead-in forming box is slotted, and means are provided for creating a vacuum in a box (2) below the cover (1) of the lead-in forming box.

15. A twin wire paper forming machine as claimed in any of claims 1 to 8, or in any of claims 12 to 14 when dependent on claims 1 to 8, characterised in that the lead-in forming box and the foil unit (5) form part of a composite unitary structure (30) which is adjustably mounted (31, 32).

16. A twin wire paper forming machine as claimed in any preceding claim, characterised by means (93) for varying the width, angle and/or shape of the inlet opening of the or each autoslice.

17. A twin wire paper forming machine as claimed in any preceding claim, characterised in that the trailing cover (10) is interchangeable.

Patentansprüche

1. Zweisiebpapiermaschine, bei welcher ein Untersieb (15) über einen Zuführformkasten und über einen stromab davon liegenden Bahnabführkasten (11) läuft, ein endloses Obersieb (14) über eine Zuführrolle (12) umgelenkt wird, auf das Untersieb (15) in dem Bereich der Zuführformkastenabdeckung (1) trifft und von dem Untersieb (15) in dem Bereich des Bahnüberführungskastens (11) abgetrennt und über eine Antriebsrolle (13) zurück zur Zuführrolle (12) laufen gelassen wird, das Untersieb (15) über eine Blatteinheit (5) läuft, die stromab von der Zuführformkastenabdeckung (1) angeordnet ist und abwechselnd massive und offene Flächen hat und bei welchem das Oberseib (14) unter eine Glättabdeckung (10) hindurchgeht, die stromab von der Blatteinheit (5) angeordnet ist, dadurch gekennzeichnet, daß die Glättabdeckung (10) eine durchgehende, am Obersieb angreifende Fläche hat, deren Vorder-

kante (101) zum Abstreifen von Wasser auf dem Obersieb in eine selbsttätige Stauvorrichtung (9) dient.

2. Zweisiebpapiermaschine nach Anspruch 1, dadurch gekennzeichnet, daß die Abdeckung (4) der Blatteinheit (5) eine Reihe von Blattklingen (41; 42) aufweist, die sich quer über die Bahn der Siebe (14, 15) erstrecken und im Abstand voneinander in Bewegungsrichtung der Siebe angeordnet sind.

3. Zweisiebpapiermaschine nach Anspruch 2, dadurch gekennzeichnet, daß jede der Klingen (41; 42) in einem Winkel zur Bewegungsrichtung der Siebe so geneigt ist, daß ihre Vorderkante Wasser von der Unterseite des Untersiebs (15) abstreifen kann.

4. Zweisiebpapiermaschine nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß die Blatteinheit (5) unter den im Abstand angeordneten Klingen (41; 42) einen Blattkasten aufweist, wobei Einrichtungen zur Erzeugung eines Vakuums in dem Blattkasten unter den im Abstand angeordneten Klingen (41; 42) vorgesehen sind.

5. Zweisiebpapiermaschine nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß Einrichtungen zur Erzeugung eines Vakuums in einer Kammer oder einem Stoffänger (91) über dem Obersieb (14) vorgesehen sind, mit denen die selbsttätige Stauvorrichtung (9) in Verbindung steht.

6. Zweisiebpapiermaschine nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Glättabdeckung (10) undurchbrochen ist und eine durchgehende Siebeingriffsoberfläche für das Obersieb (14) bildet.

7. Zweisiebpapiermaschine nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß die Abdeckung (4) der Blatteinheit (5) einen nach unten und nach vorne konvexen Weg für die Siebe (14, 15) bildet und daß die Glättabdeckung (10) einen nach oben und nach vorne konvexen Weg für die Siebe (14, 15) bildet.

8. Zweisiebpapiermaschine nach Anspruch 7, dadurch gekennzeichnet, daß der Krümmungsradius des konvexen Weges, der von der Glättabdeckung (10) gebildet ist, kleiner ist als der, der von der Abdeckung (4) der Blatteinheit (5) gebildet wird.

9. Zweisiebpapiermaschine nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß eine weitere stromauf gelegene Glättabdeckung (8) und eine zugehörige stromaufliegende selbsttätige Stauvorrichtung (7) über dem Obersieb (14) stromab von dem Zulaufformkasten (2) und stromauf von der Blatteinheit (5) angeordnet sind.

10. Zweisiebpapiermaschinen nach Anspruch 9, gekennzeichnet durch Einrichtungen zur Erzeugung eines Vakuums in einer selbsttätigen Stauvorrichtungskammer oder einem Stoffänger (71) über dem Obersieb (14), mit der/dem die stromauf liegende selbsttätige Stauvorrichtung (7) in Verbindung steht.

11. Zweisiebpapiermaschine nach Anspruch 10 oder 11, dadurch gekennzeichnet, daß die stromauf liegende Glättabdeckung (8) undurchbrochen ist und eine durchgehende am Sieb angreifende Oberfläche für das Obersieb (14) darstellt.

12. Zweisiebpapiermaschine nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Abdeckung (1) des Zulaufformkastens eine gekrümmte Siebeingriffsoberfläche hat.

13. Zweisiebpapiermaschine nach Anspruch 12, dadurch gekennzeichnet, daß die Abdeckung (1) des Zulaufformkastens undurchbrochen ist und eine durchgehende Siebeingriffsoberfläche für das Untersieb (15) darstellt.

14. Zweisiebpapiermaschine nach Anspruch 13, dadurch gekennzeichnet, daß die Abdeckung (1) des Zulaufformkastens geschlitzt ist und daß Einrichtungen zur Erzeugung eines Vakuums in einem Kasten (2) unter der Abdeckung (1) des Zulaufformkastens vorgesehen sind.

15. Zweisiebpapiermaschine nach einem der Ansprüche 1 bis 8 oder einem der Ansprüche 12 bis 14, wenn sie abhängig von den Ansprüchen 1 bis 8 sind, dadurch gekennzeichnet, daß der Zulaufformkasten und die Blatteinheit (5) einen Teil eines Verbundeinheitsaufbaus (30) bilden, der einstellbar angebracht (31, 32) ist.

16. Zweisiebpapiermaschine nach einem der vorhergehenden Ansprüche, gekennzeichnet durch Einrichtungen (93) zum Verändern der Breite, des Winkels und/oder der Form der Einlaßöffnung der oder jeder selbständigen Stauvorrichtung.

17. Zweisiebpapiermaschine nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Glättabdeckung (10) austauschbar ist.

Revendications

1. Machine à papier à toiles jumelées, dans laquelle une toile de dessous (15) passe au-dessus d'une caisse de formation d'entrée et au-dessus d'une caisse de transfert de feuille (11) en aval de la précédente, et une toile de dessus sans fin (14) qui passe sur un rouleau d'entrée (12) et rencontre la toile de dessous (15) dans la région du dessus (1) de la caisse de formation d'entrée et se sépare de la toile de dessous (15) dans la région de la caisse de transfert de feuille (11) pour passer sur un rouleau d'entraînement (13) et retourner au rouleau d'entrée (12), la toile de dessous (15) passe sur un élément à feuille métallique (5) disposé an aval du dessus (1) de caisse de formation d'entrée et qui présente alternativement des zones pleines et ouvertes, et la toile de dessus (14) passe sous un dessus de sortie (10) disposé en aval de l'élément de feuille (5), caractérisée par le fait que le dessus de sortie (10) présente une surface continue de contact avec la toile de dessus, dont le bord avant (101) sert à détacher, par docteur, de l'eau sur la toile de dessus et l'envoyer dans une règle automatique (9).

2. Machine à papier à toiles jumelées selon la revendication 1, caractérisée par le fait que le

dessus (4) de l'élément à feuille (5) comprend une série de lames (41, 42) traversant la trajectoire des toiles (14, 15) et espacées les unes des autres en direction du mouvement des toiles.

3. Machine à papier à toiles jumelées selon la revendication 2, caractérisée par le fait que chacune des lames (41, 42) est inclinée, par rapport à la direction de mouvement des toiles, selon un angle tel que son bord avant peut détacher, par docteur, l'eau de la surface de dessous de la toile de dessous (15).

4. Machine à papier à toiles jumelées selon la revendication 1, 2 ou 3, caractérisée par le fait que l'élément à feuille (5) comprend une caisse à feuille au-dessous de lames espacées (41, 42), des moyens étant prévus pour créer un vide dans la caisse à foil sous les lames (41, 42).

5. Machine à papier à toiles jumelées selon l'une des revendications 1 à 4, caractérisée par le fait que des moyens sont prévus pour créer un vide dans une chambre ou ramasse-pâte (91) au-dessus de la toile de dessus (14) et avec lequel la règle automatique (9) est en communication.

6. Machine à papier à toiles jumelées selon l'une des revendications 1 à 5, caractérisée par le fait que le dessus de sortie (10) est nu et présente une surface continue de contact avec la toile de dessus (14).

7. Machine à papier à toiles jumelées selon l'une des revendications 1 à 6, caractérisée par le fait que le dessus (4) de l'élément à feuille (5) établit pour les toiles (14, 15) une trajectoire convexe allant vers le bas et le dessus de sortie (10) établit pour les toiles (14, 15) une trajectoire convexe allant vers le haut.

8. Machine à papier à toiles jumelées selon la revendication 7, caractérisée par le fait que le rayon de courbure de la trajectoire convexe établie pour le dessus de sortie (10) est plus petit que celui de la trajectoire établie pour le dessus (4) de l'élément à feuille (5).

9. Machine à papier à toiles jumelées selon l'une des revendications 1 à 6, caractérisée par le fait qu'un autre dessus de sortie amont (8) et une règle automatique amont associée (7) sont disposés au-dessus de la toile de dessus (14) en aval de la caisse de formation d'entrée (2) et en amont de l'élément à feuille (5).

10. Machine à papier à toiles jumelées selon la revendication 9, caractérisée par l'existence de moyens pour créer un vide dans une chambre de règle automatique ou ramasse-pâte (71) au-dessus de la toile de dessus (14) et avec laquelle la règle automatique (7) est en communication.

11. Machine à papier à toiles jumelées selon la revendication 10 ou 11, caractérisée par le fait que le dessus de sortie amont (8) est nu et présente une surface continue de contact avec la toile de dessus (14).

12. Machine à papier à toiles jumelées selon l'une des revendications précédentes, caractérisée par le fait que le dessus (1) de la caisse de formation d'entrée a une surface incurvée de contact avec la toile.

13. Machine à papier à toiles jumelées selon la revendication 12, caractérisée par le fait que le dessus (1) de la caisse de formation d'entrée est nu et présente une surface continue de contact avec la toile de dessous (15).

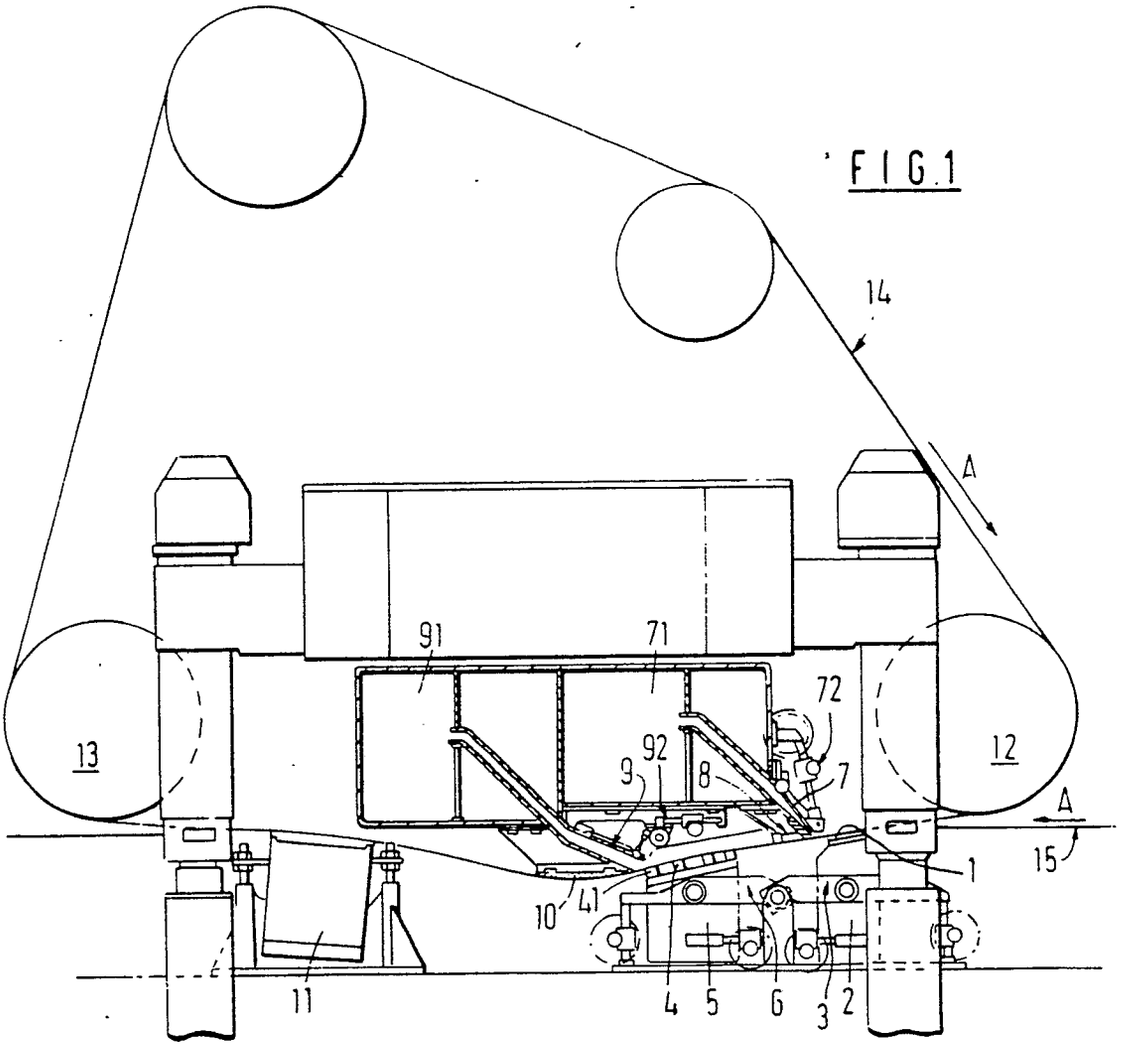
14. Machine à papier à toiles jumelées selon la revendication 13, caractérisée par le fait que le dessus (1) de la caisse de formation d'entrée est rainurée et les moyens sont prévus pour créer un vide dans une caisse (2) sous le dessus (1) de la caisse de formation d'entrée.

15. Machine à papier à toiles jumelées selon l'une des revendications 1 à 8, ou l'une des revendications 12 à 14 quand elles dépendent des revendications 1 à 8, caractérisée par le fait que la caisse de formation d'entrée et l'élément à feuille (5) font partie d'une structure unitaire composite (30) qui est montée réglable (31, 32).

16. Machine à papier à toiles jumelées selon l'une des revendications précédentes, caractérisée par des moyens (93) pour faire varier la largeur, l'angle et/ou la forme de l'orifice d'entrée du ou de chaque règle automatique.

17. Machine à papier à toiles jumelées selon l'une des revendications précédentes, caractérisée par le fait que le dessus de sortie (10) est interchangeable.

FIG.1


14
A
91
71
72
13
92
9
8
7
12
A
15
1
10
41
11
4
5
6
3
2

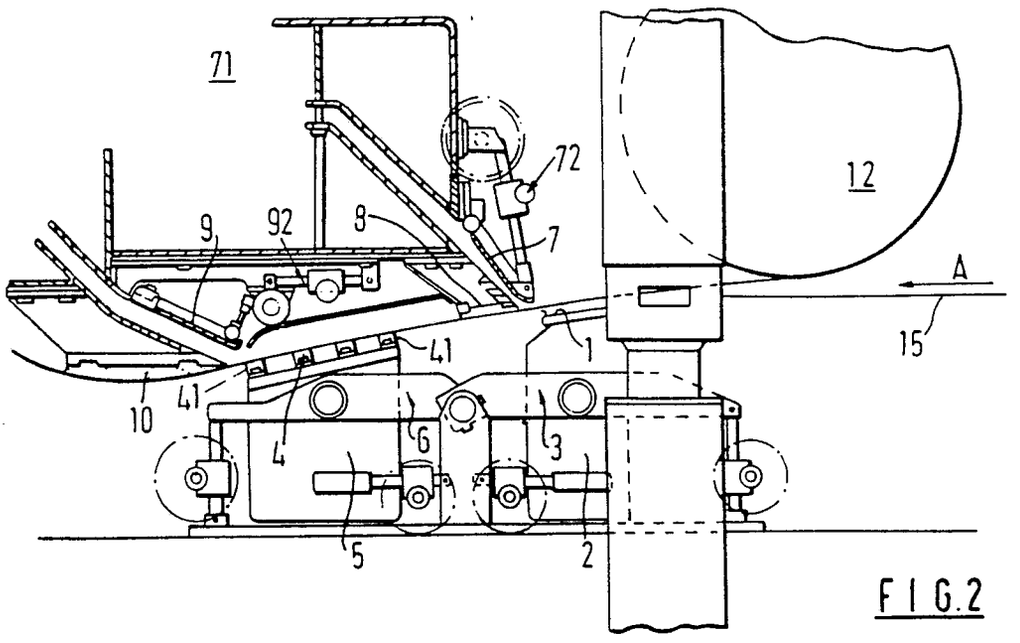

71
72
12
9
92
8
7
A
15
41
1
41
10
4
6
3
5
2

FIG.2

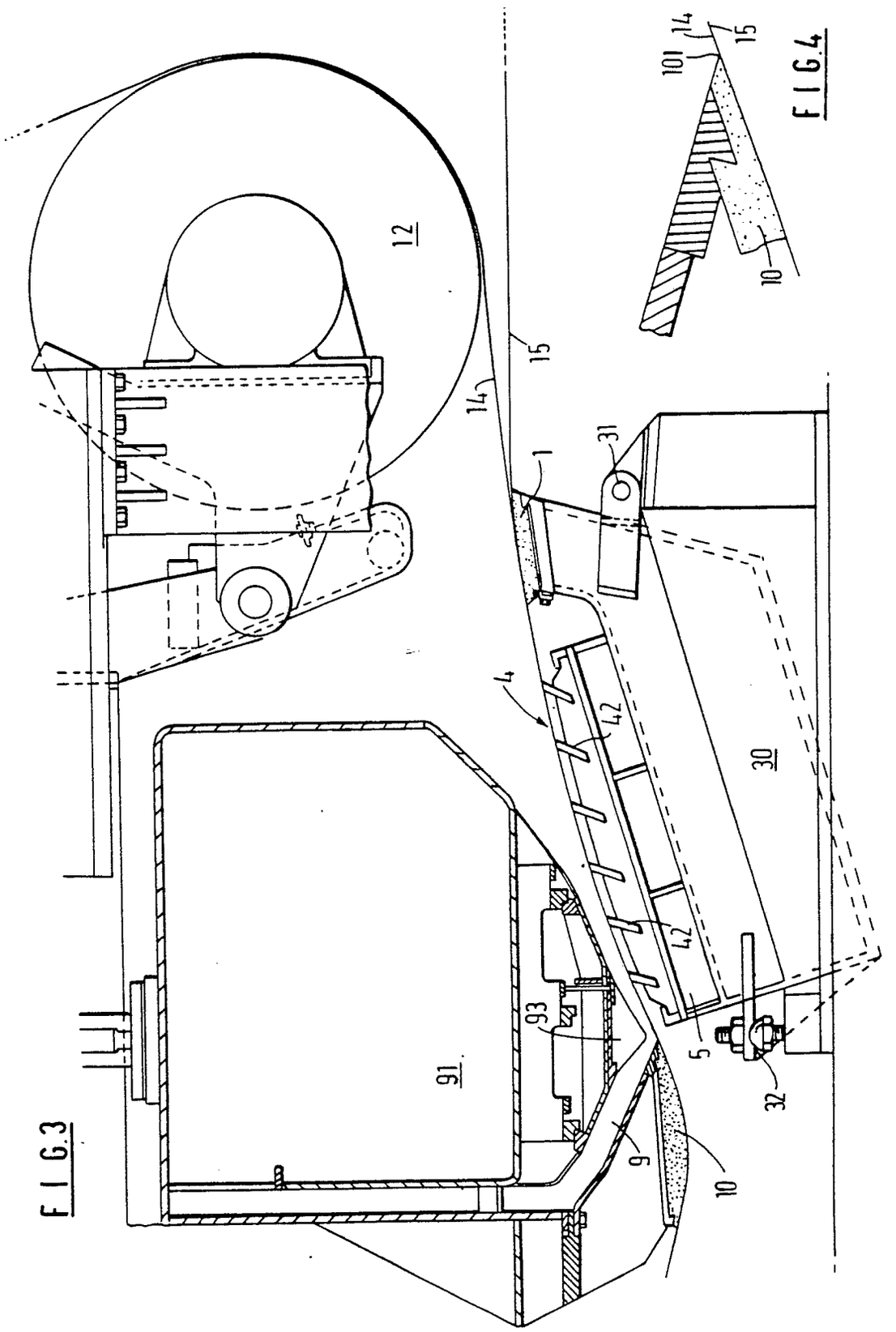


FIG.3

FIG.4